

**Science and Health/Indirect Potable Reuse
Workgroup
of the
2002 Recycled Water Task Force**

Draft White Paper Presentation

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November 19, 2002

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Task Force Workgroups

- Science and health / Indirect Potable Reuse
- Public Information, Education and Outreach
- Regulations and Permitting
- Funding / CALFED Coordination
- Plumbing Code/Cross Connection Control
- Economics

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Science & health / Indirect Potable Reuse Workgroup

Charges

The main charge is to examine the scientific basis for current reuse standards, address the importance of emerging issues of scientific and public health concern, identify any areas of research needs, and substantiate the need to reconvene the California Indirect Reuse Committee and make any other recommendations to remove impediments to water reuse.

Issues

- Groundwater recharge
- Surface water augmentation
- Applied research on wastewater reuse by academic institutions
- Pharmaceutical and trace elements
- Construction, design, operation & maintenance
- Testing and certification to insure safe use
- Epidemiological studies update to provide current assessment of the science regarding public health and water reuse

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• Water Recycling

The process of treating wastewater to produce “recycled water” for beneficial uses, its transportation to the place of use and its actual use.

“Recycled water” however, is defined in the California Water Code to mean “water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.”

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Water Recycling accomplishes two fundamental functions:

- the treated effluent is used as a water resource for beneficial purposes, and
- the effluent is kept out of streams, lakes, and beaches; thus, reducing pollution of surface water and groundwater.

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The foundation of water recycling is built upon three principles:

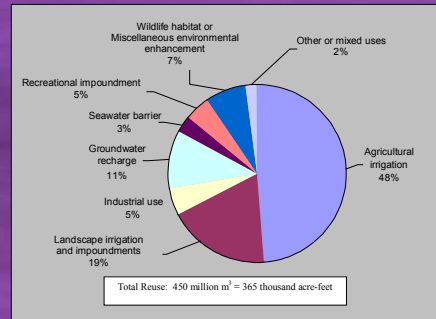
- Providing reliable treatment of wastewater to meet strict water quality requirements for the intended reuse application,
- Protecting public health, and
- Gaining public acceptance and support.

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Through integrated water resources planning, the use of recycled water may provide sufficient flexibility to allow a water agency to respond to short-term needs as well as increase the reliability of long-term water supplies.

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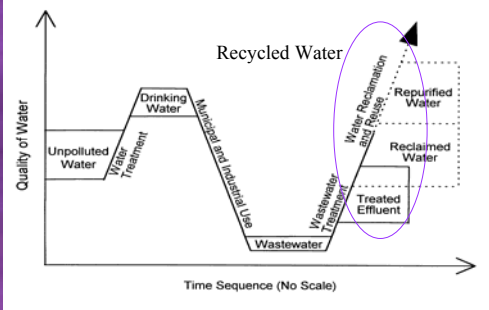
I. Recycling in California



Wastewater reclamation and reuse in California (2001 SWRCB/OWR database)

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II. Spectrum of reclaimed water quality



Water quality changes during municipal uses of water in a time sequence and the concept of water recycling (Asano, T., *Water Science & Technology*, Vol. 45, No. 8, p. 29, 2001.)

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II. Spectrum of reclaimed water quality

Health risk assessment for recycled water use

Despite a long history of water reuse in California, the question of safety of recycled water use is still difficult to define and delineation of acceptable health risks has been hotly debated.

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II. Spectrum of reclaimed water quality

•Health risk assessment for recycled water use

Four water quality factors are of particular concern:

- (1) microbiological quality,
- (2) total mineral content (e.g., total dissolved solids),
- (3) presence of toxicant of the heavy metal type, and
- (4) the concentration of stable organic substances.

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II. Spectrum of reclaimed water quality

Microbiological

Health risk assessment for recycled water use

The U.S. EPA Surface Water Treatment Rule (SWTR) (U.S. EPA, 1989) defines an acceptable risk as less than or equal to one pathogen-derived infection per 10,000 population per year from use of a public water supply.

Therefore, if a 10^{-4} annual risk of infection (less than or equal to one infection per 10,000 population per year) is set as an acceptable risk for recycled water use, the reliability can be calculated as the percent of time that infection risk due to exposure to enteric viruses in recycled water is less than the acceptable risk.

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Health risk assessment for recycled water use

Recent studies in environmental toxicology and pharmacology have revealed potential long-term health risks associated with chemical compounds such as disinfection byproducts (DBPs), pharmaceutically active compounds (PhACs), pesticides, and personal care products (PCPs) at low concentrations (orders of ppb and ppt).

Those trace organic compounds along with some inorganic compounds such as arsenic and hexavalent chromium found in reclaimed water are of special concern for human and ecological health risk.

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- The need to reconvene the California Indirect Reuse Committee.
- Other issues (Water Softeners, One Molecule Rule,...)

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Issues

- Groundwater recharge

Finding

- State of California has been in the forefront of providing regulatory guidance in groundwater recharge with reclaimed wastewater. The State of California Interagency Water Reclamation Coordinating Committee has conducted the Scientific Advisory Panel during 1986-87 and issued the *Report of the Scientific Advisory Panel on Groundwater Recharge with Reclaimed Wastewater* in November 1987.
- Based on the Scientific Advisory Panel Report, groundwater recharge criteria with reclaimed wastewater were drafted by the Department of Health Services in late 1980s and the Draft Criteria have been updated several times with the most recent version issued in April 2001.

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Finding

- The WG request the Task Force to recommend to the Legislature that more state funding is needed for research.

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- Based on the overall discussion on research issues, this recommendation could be expanded to include the following themes:
 - A need for long-term sustained research funding
 - Research on water recycling treatment, testing and monitoring methods and development of innovative/emerging technologies
 - Flexibility to study emerging issues that are constantly arising
 - Long-term research on fundamental scientific principles and mechanisms addressing technology, public and environment health that generate quality biophysical and, engineering-oriented knowledge that will be a solid foundation for public policy and regulation of water recycling
 - Preparation of well-educated practitioners on water recycling production, quality, and use.

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... the need to reconvene the California Indirect Reuse Committee.

Finding

- After extensive discussions among the Workgroup members, the consensus of the workgroup was to recommend not to convene a science-based panel to address indirect potable reuse.
- The State of California Department of Health Services should be able to make informed and scientific determinations on issues related to indirect potable reuse based on the following publications.
 - “Report of the Scientific Advisory Panel, 1987.
 - “Issues in Potable Reuse –NRC, 1998.

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- **Other issues (Water Softeners, One Molecule Rule,...)**

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Other issues are being evaluated in conjunction with other workgroups:

- Water Softeners (Bill Everest and Rafael Mujeriego have authored an issue paper)
- Soil Aquifer Treatment Study (Hoover Ng has prepared a memorandum on total organic carbon removal efficiencies from soil aquifer treatment)
- One Molecule Rule (Keith Lewinger prepared a write-up on this issue)

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